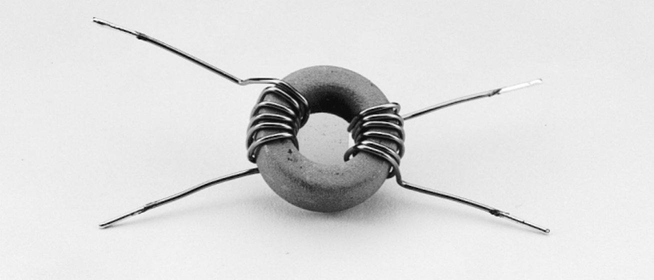
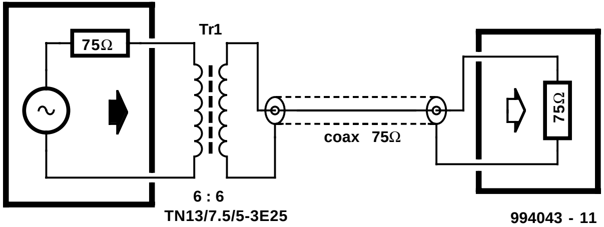
029

isolating transformer for S/PDIF





T. Giesberts

WARNING: do not use this transformer for mains isolating, because its insulation is not capable of handling this. It is intended to prevent earth loops arising or undesired signals being applied to the input of an appliance. For instance, a tape recorder is to be linked to a sound card in a computer which has an S/PDIF (Sony/Philips Digital Interface Format); the computer is not connected to protective earth (which in the UK is next to impossible and certainly not advisable). Owing to the mains filter, half the mains voltage will be present on the enclosure and thus on the input earth. The linking of this potential to the tape recorder is prevented by the isolating transformer in the diagram.

To ensure a good bandwidth, the coupling factor of the transformer must be good (low stray self-inductance), so that a core with a high μ_τ is needed. The prototype uses a Philips Type TN13/7.5/5-3E25, which has a μ_τ of 4500. The primary and secondary windings, each consisting of six turns of 0.5 mm dia. enamelled copper wire, are laid on opposite sides of the toroid. The windings should be covered with insulating tape. If heavy-duty, insulated wire is used for the windings, they can be laid over one another, which improves the coupling factor. But even with the first method, the bandwidth ranged from 50 kHz to 17 MHz, which is more than adequate for an S/PDIF link.

Place the transformer directly at the output of the signal source. The reason for this is that the input and output impedances of the transformer are not exactly 75 Ω. With the transformer directly at the source and provided the coaxial cable at the computer end is terminated correctly into 75 Ω, all will be well.

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